Wireless/Serial(RS232) Converter
WCS-232 v4.0

User Manual
2nd Edition

RoHS

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1. Introduction

WCS-232 v4.0 converts RS-232 serial signals to Bluetooth RF signals.

■ **Product box contains**

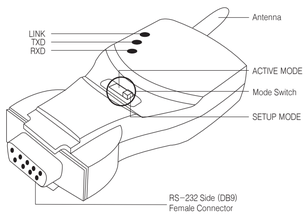
- Blutooth to Serial Converter 2EA - User Manual
- A/C Power Supply (9V DC) 2EA - USB Power Cable 2EA

2. Specifications

Model Name	WCS-232 v4.0
Type	Bluetooth-Serial(RS232) Converter
Distance	Nom. 100m up to 1000m using Patch Antenna
Voltage	5V ~ 12V/DC (Polarity : Independent)
Wireless interface	Bluetooth Specification Version 2.0+EDR Class1
Frequency bandwidth	2402 ~ 2480 MHz
Radio mode	Frequency Hopping
Channels	7
Modulation	GFSK
Current	Max 80mA, Min 2mA
Temperature	-20 ~ 70 °C
Antenna	SAT-G01R : +1dBi Stub Antenna DAT-G01R : +3dBi Dipole Antenna(optional) DAT5-G01R : +5dBi Dipole Antenna(optional) PAT-G01R : +9dBi Patch Antenna(optional)
Serial communication	1200 bps-115.2 Kbps Full Duplex 8 Data bits - Odd, Even, No Parit - 1, 2 Stop bits
Flow Control	RTS/CTS ON/OFF possible, DTR/DSR/DCD Loop Back connected

3. Architecture

1) External View



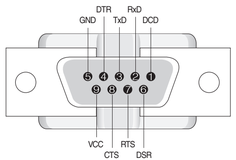
2) Mode Switch

SETUP ACTIVE : Active Mode
SETUP ACTIVE : Setup Mode

3) LED

- LINK : Turns red when power is supplied
  Turns green when remotely linked with the other party
- TxD : Turns green when data is transmitting (turns on faintly only if linked)
- RxD : Turns red when data is receiving

4) Connector



DB-9 Connector Pin-Layout

4. Installation Procedures

1) Connection

There is no need to install additional programs in your computer or communication devices to use the WCS-232 v4.0. Connect the WCS-232 v4.0 to a serial port at your computer or communication device and supply it with power. Then you can easily access it as if you were using the existing serial port.
WCS-232 v4.0 can be powered by the following methods: DC power supply, PC USB port through USB cable or DB9 pin connector (available only if special serial ports are used).
A Bluetooth connection between two devices using the WCS-232 v4.0 is automatically established when both WCS-232 v4.0 are powered on. After that, LINK LED turns red and you are free to use the WCS-232 v4.0.

2) Environment Setting

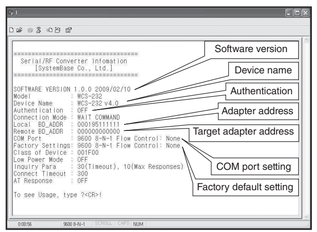
Since WCS-232 v4.0 are connected onto the serial port of your PC or communication device, you should specify the serial port environment information (Baud rate, data bits, parity bit, stop bit, flow control, etc.) and the RF connection (device name, operating mode, target address, etc.) for mutual communication.
RF connection setting is required only if you communicate with other manufacturer's Bluetooth devices instead of the WCS-232 v4.0 or change the initial setting.
For environment setting, please use "Hyper terminal" included in your Windows' operating system.

5. Operating Environment Setting

1) Procedures

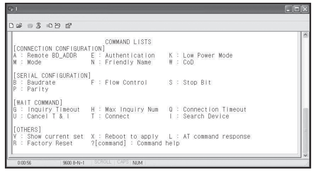
WCS-232 v4.0 can set baud rate, parity, stop bit, device name, target adapter and operating mode using Hyper Terminal.

① Connect one WCS-232 v4.0 to the PC serial port and power it on.
② Run Windows' Hyper Terminal program.
③ Whenever you change environment setting, you must Set baud rate, data bits, parity and stop bit to 9600-8-NONE-1 (Initial Factory Setting) at Hyper Terminal.
④ Select setup mode at the WCS-232 v4.0 mode switch. Then software version information will be displayed



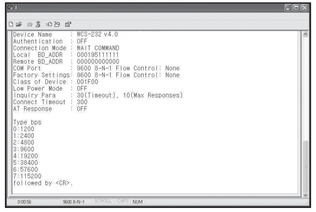
⑤ Set up serial port. < Refer to 2)Serial Settings >
⑥ Setup RF connection. < Refer to 3)RF Connection Setting >
⑦ After completing the setting, be sure to execute 'X' command and save, and then the Mode Switch to 'Active.'

■ **Reference:**
If you enter '?', the list for all commands is displayed, and if '?<command>', how to use the requested command is displayed. All commands should be typed with capital letter. All commands and setting values are case-sensitive.

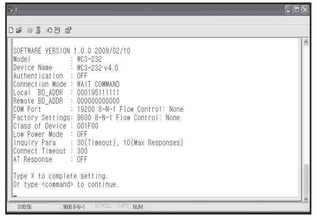

[CONNECTION CONFIGURATION] COMMAND LISTS
A : Remote BD_ADDR E : Authentication K : Low Power Mode
M : Mode N : Friendly Name R : CoD
[SERIAL CONFIGURATION]
B : Baudrate F : Flow Control S : Stop Bit
P : Parity
[WAIT COMMAND]
N : Inquiry Timeout H : Max Inquiry Num Q : Connection Timeout
U : Cancel T & I T : Connect I : Search Device
[OTHERS]
V : Show current set X : Reboot to apply L : AT command response
W : Factory Reset ?[command] : Command help

2) Serial Settings

■ Example of Baud Rate Setting (9600 bps ➞ 19200 bps)
① Type 'B'.



② Type '4' to select 19200 bps.


SOFTWARE VERSION 1.0.0 2009/02/10
Model : WCS-232
Device Name : WCS-232 v4.0
Authentication : OFF
Connection Mode : WAIT COMMAND
Local BD_ADDR : 000195111111
Remote BD_ADDR : 000000000000
COM Port : 19200 8-N-1 Flow Control: None
Factory Settings: 9600 8-N-1 Flow Control: None
Class of Device : 001F00
Low Power Mode : OFF
Inquiry Para : 30(Timeout), 10(Max Responses)
Connect Timeout : 300
AT Response : OFF
Type X to complete setting.
Or type <command> to continue.

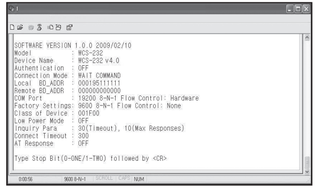
③ The set value is shown on the screen again. (All the same in the next procedures)

■ Example of Flow Control Setting (None ➞ Hardware)
① Type 'F'.

SOFTWARE VERSION 1.0.0 2009/02/10
Model : WCS-232
Device Name : WCS-232 v4.0
Authentication : OFF
Connection Mode : WAIT COMMAND
Local BD_ADDR : 000195111111
Remote BD_ADDR : 000000000000
COM Port : 19200 8-N-1 Flow Control: None
Factory Settings: 9600 8-N-1 Flow Control: None
Class of Device : 001F00
Low Power Mode : OFF
Inquiry Para : 30(Timeout), 10(Max Responses)
Connect Timeout : 300
AT Response : OFF
Type Flow Control(0-None/1-Hardware/2-DTR/DSR) followed by <CR>.

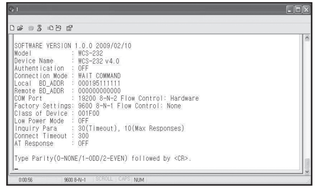
② Type '1' to use hardware flow control.

■ Example of Stop Bit Setting (1 bit ➞ 2 bits)
① Type 'S'.


SOFTWARE VERSION 1.0.0 2009/02/10
Model : WCS-232
Device Name : WCS-232 v4.0
Authentication : OFF
Connection Mode : WAIT COMMAND
Local BD_ADDR : 000195111111
Remote BD_ADDR : 000000000000
COM Port : 19200 8-N-1 Flow Control: Hardware
Factory Settings: 9600 8-N-1 Flow Control: None
Class of Device : 001F00
Low Power Mode : OFF
Inquiry Para : 30(Timeout), 10(Max Responses)
Connect Timeout : 300
AT Response : OFF
Type Stop Bit(0-ONE/1-TWO) followed by <CR>

② Type '1' to change a stop bit to 2 bits.

■ Example of Parity Bit Setting (None ➞ Even)
① Type 'P'.

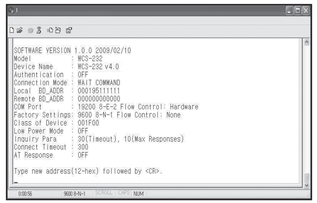

SOFTWARE VERSION 1.0.0 2009/02/10
Model : WCS-232
Device Name : WCS-232 v4.0
Authentication : OFF
Connection Mode : WAIT COMMAND
Local BD_ADDR : 000195111111
Remote BD_ADDR : 000000000000
COM Port : 19200 8-N-1 Flow Control: Hardware
Factory Settings: 9600 8-N-1 Flow Control: None
Class of Device : 001F00
Low Power Mode : OFF
Inquiry Para : 30(Timeout), 10(Max Responses)
Connect Timeout : 300
AT Response : OFF
Type Parity(0-NONE/1-ODD/2-EVEN) followed by <CR>.

② Type '2' to change to even parity.

3) RF Connection Settings

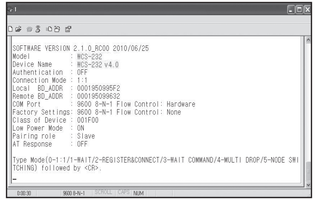
This is necessary only if you communicate with other manufacturer's Bluetooth devices instead of the WCS-232 v4.0 or change the initial settings.

■ Example of Target Address Setting
(00:00:00:00:00:00 ➞ 00:02:78:01:EF:BC)
① Type 'A'


SOFTWARE VERSION 1.0.0 2009/02/10
Model : WCS-232
Device Name : WCS-232 v4.0
Authentication : OFF
Connection Mode : WAIT COMMAND
Local BD_ADDR : 000195111111
Remote BD_ADDR : 000000000000
COM Port : 19200 8-N-2 Flow Control: Hardware
Factory Settings: 9600 8-N-1 Flow Control: None
Class of Device : 001F00
Low Power Mode : OFF
Inquiry Para : 30(Timeout), 10(Max Responses)
Connect Timeout : 300
AT Response : OFF

② Type the target address to be changed. You have to enter the 12-digit hexadecimal address. After typing "00027801EFBC", press 'Enter' key.

■ Example of Connection Mode Setting (WAIT COMMAND ➞ WAIT)
① First, enter 'M' to display the way to use the requested command. To set the connection mode at Wait mode, the input value shall be '1.'
② Type 'M.'


SOFTWARE VERSION 2.1_RC00 2010/06/25
Model : WCS-232
Device Name : WCS-232 v4.0
Authentication : OFF
Connection Mode : 1:1
Local BD_ADDR : 000185099SF2
Remote BD_ADDR : 000185099832
COM Port : 9600 8-N-1 Flow Control: Hardware
Factory Settings: 9600 8-N-1 Flow Control: None
Class of Device : 001F00
Low Power Mode : OFF
AT Response : OFF
Pairing role : Slave
Low Power Mode : ON
Type Mode(0-1:1/1-WAIT/2-REGISTERACONNECT/3-WAIT COMMAND/4-MULTI DROP/5-NODE SWITCHING) followed by <CR>.

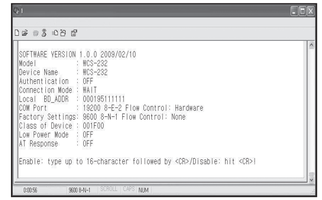
③ Type '1.'

■ Example of Device Name Setting(WCS-232 v4.0 ➞ WCS-232)
① Type 'N'.

Type X to complete setting.
Or type <command> to continue.
SOFTWARE VERSION 1.0.0 2009/02/10
Model : WCS-232
Device Name : WCS-232 v4.0
Authentication : OFF
Connection Mode : WAIT
Local BD_ADDR : 000195111111
COM Port : 19200 8-E-2 Flow Control: Hardware
Factory Settings: 9600 8-N-1 Flow Control: None
Class of Device : 001F00
Low Power Mode : OFF
AT Response : OFF
Type up to 30-character followed by <CR>.

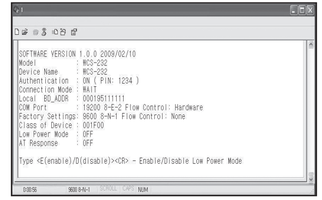
② Enter the desire device name(In this example, WCS-232) and press 'Enter' key (however, up to 30 alphanumeric characters possible).

■ Example of Setting PIN
① Type 'E'.


SOFTWARE VERSION 1.0.0 2009/02/10
Model : WCS-232
Device Name : WCS-232
Authentication : OFF
Connection Mode : WAIT
Local BD_ADDR : 000195111111
COM Port : 19200 8-E-2 Flow Control: Hardware
Factory Settings: 9600 8-N-1 Flow Control: None
Class of Device : 001F00
Low Power Mode : OFF
AT Response : OFF
Enable: type up to 16-character followed by <CR>/Disable: hit <CR>!

② Enter the desire PIN value and press 'Enter' key. (However, up to 16 alphanumeric characters possible)

■ Example of Setting Low Power Mode
① Enter 'K.' If you want to set up a low power mode, enter 'E,' or if not, enter 'D.'


SOFTWARE VERSION 1.0.0 2009/02/10
Model : WCS-232
Device Name : WCS-232
Authentication : ON (PIN: 1234)
Connection Mode : WAIT
Local BD_ADDR : 000195111111
COM Port : 19200 8-E-2 Flow Control: Hardware
Factory Settings: 9600 8-N-1 Flow Control: None
Class of Device : 001F00
Low Power Mode : OFF
AT Response : OFF
Type <E(enable)/D(disable)><CR> - Enable/Disable Low Power Mode

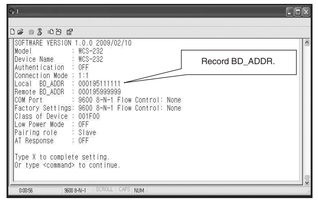
■ Display Device Information
① Type 'V.'

SOFTWARE VERSION 1.0.0 2009/02/10
Model : WCS-232
Device Name : WCS-232
Authentication : ON (PIN: 1234)
Connection Mode : WAIT
Local BD_ADDR : 000195111111
COM Port : 19200 8-E-2 Flow Control: Hardware
Factory Settings: 9600 8-N-1 Flow Control: None
Class of Device : 001F00
Low Power Mode : OFF
AT Response : OFF

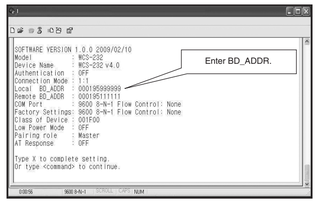
② All current information is displayed. At this time, verify that the values are identical to the ones you have once set.

■ WCS-232 v4.0 Pair Setting
The following example showing how to set up the destination WCS-232 v4.0 address.

① Set baud rate, data bits, parity and stop bit to 9600-8-NONE-1 at Hyper Terminal.
② Connect one of WCS-232 v4.0 to your PC serial port and put 'Mode Switch' to Setup Mode. and Record displayed BD_ADDR.


SOFTWARE VERSION 1.0.0 2009/02/10
Model : WCS-232
Device Name : WCS-232
Authentication : OFF
Connection Mode : 1:1
Local BD_ADDR : 000195111111
Remote BD_ADDR : 000195999999
COM Port : 9600 8-N-1 Flow Control: None
Factory Settings: 9600 8-N-1 Flow Control: None
Class of Device : 001F00
Low Power Mode : OFF
Pairing role : Slave
AT Response : OFF
Type X to complete setting.
Or type <command> to continue.
Record BD_ADDR.

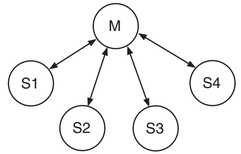
③ Remove WCS-232 v4.0(Used at stage ②) from your PC serial port, and connect the target WCS-232 v4.0 and then set the registered BD_ADDR using 'A' command.


SOFTWARE VERSION 1.0.0 2009/02/10
Model : WCS-232
Device Name : WCS-232 v4.0
Authentication : OFF
Connection Mode : 1:1
Local BD_ADDR : 000195999999
Remote BD_ADDR : 000195111111
COM Port : 9600 8-N-1 Flow Control: None
Factory Settings: 9600 8-N-1 Flow Control: None
Class of Device : 001F00
Low Power Mode : OFF
Pairing role : Master
AT Response : OFF
Type X to complete setting.
Or type <command> to continue.
Enter BD_ADDR.

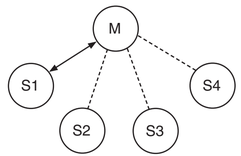
④ Save the setting using 'X' command and then put the 'Mode Switch' to 'Active'.
⑤ Apply stage ②~④ procedures to the target WCS-232 v4.0, and set the opposite BD_ADDR of two WCS-232 v4.0 devices to TARGET_ADDR.

4) Multiple Connection mode (1:N) Communication

■ Overview
Although the WCS-232 is RS232, WCS-232 supports multiple connections up to 4 slave units. There are two types of multiple connection modes: Multi-Drop mode and Node-Switching mode.
In Multi-Drop mode, the master can connect to maximum 4 slaves. At the same time, they transfer the data interactively as below figure.



In Node-Switching mode, the master can connect to maximum 4 slaves. But, only one connection with one slave is active and the data is transferred as below figure.



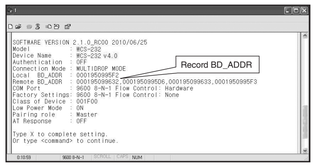
■ Multi-Drop mode setting
You don't have to use software program separately.
① Set baud rate, data bits, parity and stop bit to 9600-8-NONE-1 at Hyper Terminal.
② Connect WCS-232 v4.0 used a master to your PC serial port and put 'Mode Switch' to Setup Mode.
③ To use by Multiple Connection mode, change the 1:1 mode with Multi-Drop mode.
(Type 'M' and type '4' to select Multi-Drop mode.)

SOFTWARE VERSION 2.1.0_RC00 2010/06/25
Model : WCS-232
Device Name : WCS-232 v4.0
Authentication : OFF
Connection Mode : 1:1
Local BD_ADDR : 000195995F2
Remote BD_ADDR : 000195999632
COM Port : 9600 8-N-1 Flow Control: Hardware
Factory Settings: 9600 8-N-1 Flow Control: None
Class of Device : 001F00
Low Power Mode : ON
Pairing role : Slave
AT Response : OFF
Type Mode(0-1:1/1-WAIT/2-REGISTER&CONNECT/3-WAIT COMMAND/4-MULTI DROP/5-NODE SWITCHING) followed by <CR>.

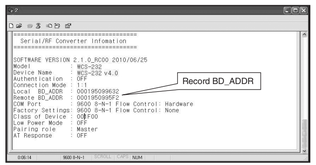
④ Save the setting using 'X' command and then put the 'Mode Switch' to 'Active."

SOFTWARE VERSION 2.1.0_RC00 2010/06/25
Model : WCS-232
Device Name : WCS-232 v4.0
Authentication : OFF
Connection Mode : MULTIDROP MODE
Local BD_ADDR : 000195995F2
Remote BD_ADDR : 000195999632,000195999506,000195999633,000195995F3
COM Port : 9600 8-N-1 Flow Control: Hardware
Factory Settings: 9600 8-N-1 Flow Control: None
Class of Device : 001F00
Low Power Mode : ON
Pairing role : Master
AT Response : OFF
Type X to complete setting.
Or type <command> to continue.

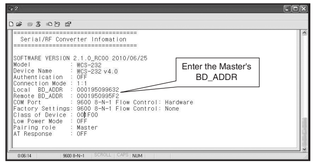
⑤ Record displayed Local BD_ADDR of the master.


SOFTWARE VERSION 2.1.0_RC00 2010/06/25
Model : WCS-232
Device Name : WCS-232 v4.0
Authentication : OFF
Connection Mode : MULTIDROP MODE
Local BD_ADDR : 000195995F2
Remote BD_ADDR : 000195999632,000195999506,000195999633,000195995F3
COM Port : 9600 8-N-1 Flow Control: Hardware
Factory Settings: 9600 8-N-1 Flow Control: None
Class of Device : 001F00
Low Power Mode : ON
Pairing role : Master
AT Response : OFF
Type X to complete setting.
Or type <command> to continue.
Record BD_ADDR

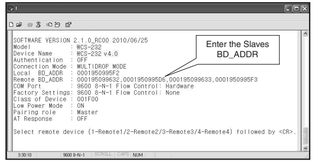
⑥ Connect WCS-232 v4.0 used slaves to your PC serial port and put 'Mode Switch' to Setup Mode.
⑦ Record displayed Local BD_ADDR of the slaves. (Note: Maintain the status that master's Hyper Terminal page opened.)


Serial/RF Converter Infomation
SOFTWARE VERSION 2.1.0_RC00 2010/06/25
Model : WCS-232
Device Name : WCS-232 v4.0
Authentication : OFF
Connection Mode : 1:1
Local BD_ADDR : 000195999632
Remote BD_ADDR : 000195995F2
COM Port : 9600 8-N-1 Flow Control: Hardware
Factory Settings: 9600 8-N-1 Flow Control: None
Class of Device : 001F00
Low Power Mode : OFF
Pairing role : Master
AT Response : OFF
Record BD_ADDR

⑧ Change the slaves' Remote BD_ADDR with the master's Local BD_ADDR. (Set the master's registered BD_ADDR using 'A' command.)


Serial/RF Converter Infomation
SOFTWARE VERSION 2.1.0_RC00 2010/06/25
Model : WCS-232
Device Name : WCS-232 v4.0
Authentication : OFF
Connection Mode : 1:1
Local BD_ADDR : 000195999632
Remote BD_ADDR : 000195995F2
COM Port : 9600 8-N-1 Flow Control: Hardware
Factory Settings: 9600 8-N-1 Flow Control: None
Class of Device : 001F00
Low Power Mode : OFF
Pairing role : Master
AT Response : OFF
Enter the Master's BD_ADDR

⑨ Change the master's Remote BD_ADDR with the slaves' Local BD_ADDR. (Set the each slaves' registered BD_ADDR using 'A' command.)


SOFTWARE VERSION 2.1.0_RC00 2010/06/25
Model : WCS-232
Device Name : WCS-232 v4.0
Authentication : OFF
Connection Mode : MULTIDROP MODE
Local BD_ADDR : 000195995F2
Remote BD_ADDR : 000195999632,000195999506,000195999633,000195995F3
COM Port : 9600 8-N-1 Flow Control: Hardware
Factory Settings: 9600 8-N-1 Flow Control: None
Class of Device : 001F00
Low Power Mode : ON
Pairing role : Master
AT Response : OFF
Select remote device (1-Remote1/2-Remote2/3-Remote3/4-Remote4) followed by <CR>.
Enter the Slaves BD_ADDR

⑩ Set the slaves' mode not Multi-Drop mode but wait mode. (Type 'M' and type '1' to select wait mode)

SOFTWARE VERSION 2.1.0_RC00 2010/06/25
Model : WCS-232
Device Name : WCS-232 v4.0
Authentication : OFF
Connection Mode : 1:1
Local BD_ADDR : 000195995F2
Remote BD_ADDR : 000195999632
COM Port : 9600 8-N-1 Flow Control: Hardware
Factory Settings: 9600 8-N-1 Flow Control: None
Class of Device : 001F00
Low Power Mode : OFF
Pairing role : Master
AT Response : OFF
Type Mode(0-1:1/1-WAIT/2-REGISTER&CONNECT/3-WAIT COMMAND/4-MULTI DROP/5-NODE SWITCHING) followed by <CR>.

■ Node-Switching mode setting
All processes are equal to Multi-Drop mode setting. But, the difference is not 'Multi-Drop mode' but 'Node-Switching mode.' For example, in Multi-Drop mode, type 'M' and type '4' to select Multi-Drop mode. But, in Node-Switching mode, type 'M' and type '5' to select Node Switching mode.

SOFTWARE VERSION 2.1.0_RC00 2010/06/25
Model : WCS-232
Device Name : WCS-232 v4.0
Authentication : OFF
Connection Mode : 1:1
Local BD_ADDR : 000195995F2
Remote BD_ADDR : 000195999632
COM Port : 9600 8-N-1 Flow Control: Hardware
Factory Settings: 9600 8-N-1 Flow Control: None
Class of Device : 001F00
Low Power Mode : ON
Pairing role : Slave
AT Response : OFF
Type Mode(0-1:1/1-WAIT/2-REGISTER&CONNECT/3-WAIT COMMAND/4-MULTI DROP/5-NODE SWITCHING) followed by <CR>.

In Node-Switching mode, the master unit maintains multiple connections with maximum 4 slave units but only one connection with one slave unit is active and data is transferred. Active slave is selected by AT commands. (Need for software program)

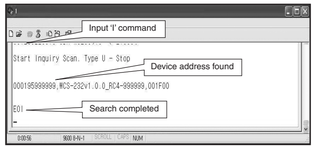
```
On communication after connecting
+++
OK
ATO1 - Communicating with #1 Slave
+++
OK
ATO000195000003 - Communicating with slave of BD 000195000003
```

■ Note
When large data exchange occurs in Multi-Drop mode without flow-control enabled, the master unit may experience data loss. It may also experience occasional disconnections and/or system rebooting especially when bi-directional communication happens. It is strongly recommended extensive performance test before any real world field applications.
Node-switching mode provides nearly equivalent performance as single connection mode. It is always recommended to use flow-control for both of Multi-Drop mode and Node Switching Mode.

Appendix-A : Wait for user command mode

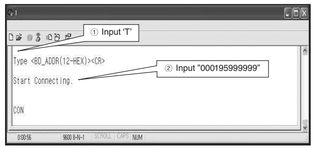
The Wait Mode that waits for a command by a user performs search and connection of accessories. The correspondent adapter shall be set up in Wait Mode.

■ Search
It searches Bluetooth devices connected and serviced in the same coverage.



After execution of the command, the adapter address searched is displayed

■ Connect
Connection to a specific device



After execution of the command, the ready of communication is ended and the communication is enabled in Active Mode.

Appendix-B : Command

Items	Commands	Descriptions	Remarks
1. Connection Setting	A(addr)	Setting for the address of device to be connected addr: 12 numbers in Hex	
2. Baud Rate Setting	B(BR)	Setting for baud rate. BR(Baudrate): 0 ~ 7	0: 1200, 1: 2400 2: 4800, 3: 9600 4: 19200, 5: 38400 6: 57600, 7: 115200
3. PIN Number Setting	E(PIN / Enter)	Setting for authentication / ciphering. PIN: 16 letters (max) Enter: deactivated	After authentication and ciphering, two adapters are to be connected if their PIN numbers are the same.
4. Flow Control Setting	F(FC)	Setting for flow control FC: 0 ~ 1	0: None 1: Hardware
5. Search Timeout Setting	G(TO)	Setting for search timeout TO(timeout): 0 ~ 999	Effective in connection mode 2. Default: 10 seconds
6. Maximum Search Setting	H(NO)	Setting for the maximum number of devices to be searched NO(Respondents): 0 ~ 999	Effective in connection mode 2. Default: 10
7. Search Execution	I(TO,NO)	Search for Bluetooth devices connected TO(timeout): 0 ~ 999 NO(corresponents): 0 ~ 999	Effective in connection mode 2. Search will be completed when it reaches either timeout or the maximum number of correspondents.
8. Search Response Setting	J(E/D)	Setting whether to respond to search request E: Enabled D: Disenabled	Effective in connection mode 1.
9. Power save setting	K(E/D)	Setting for power save mode E: Enabled D: Disenabled	
10. Connection Mode Setting	M(mode)	Setting for connection mode The default setting for WCS-232 v4.0 is connection mode 0, and connection modes 1,2 are used for the connection with other Bluetooth devices. Mode: 0 ~ 2	0: 1:1 connection 1: connection waiting 2: wait for user command
11. Name Setting	N(name)	Setting for friendly name. Name: 30 letters (max.)	Along with the address, it is available for ID.
12. Parity Bit Setting	P(PA)	Setting for parity bit. PA: 0 ~ 2	0: None 1: Odd 2: Even
13. Connection Timeout Setting	Q(TO)	Setting for timeout connection. TO(timeout): 0 ~ 999	Effective in connection mode 2
14. Stop Bit Setting	S(ST)	Setting for stop bit. ST: 0 ~ 1	0: 1 Stop 1: 2 Stop
15. Connection Execution	T(addr, [TO])	Connection to a specific device. addr: 12 numbers in Hex [TO](timeout): 0 ~ 999	Effective in connection mode 2
16. Execution Cancellation	U	Cancellation of device search and connection command.	Effective in connection mode 2
17. Setting Confirmation	V	Displays current setting.	Software version information included
18. CoD Setting	W(CoD)	Setting for class of device. CoD: 6 numbers in Hex	Default: "001F00" Critical factor for search
19. Setting Change Save	X	Applies edited settings.	After command, WCS-232 v4.0 shall be rebooted.
20. Status Display	Z	Displays the status of WCS-232 v4.0.	S: Idle P: Pairing C: Connecting A: PIF on I: Inquiring
21. Help	?([command])	Displays command list and help.	Commands shown are depending on the Current Mode.
22. AT Command Response	L(E/D)	Setting whether to respond to AT command	AT command can be used in mode 2
23. Factory Reset	R	Setting for factory reset	

※ User should change hyper terminal setting value as like Baud rate, Parity bit, Stop bit to assigned factory default value in the Set-up mode, If user has changed factory default's setting value.

Appendix-C : Trouble Shooting

C-1. No Data Transmission

C-1-1. COM Port Settings
Check whether the Baud rate of WCS-232 v4.0 matches that of its host equipment.
Check whether the host equipment has a Data bit setting of 8. WCS-232 v4.0 supports only 8 Data bit settings. If your host equipment uses 7 Data bit and even or odd parity, it may work with a 8 Data bit and No parity setting. This is valid only when both DCE devices are the WCS-232 v4.0. In this case, set both WCS-232 v4.0] to 8 Data bit and No parity. If one of DCE devices is another Bluetooth device such as Bluetooth USB dongle,7 bit data configurations will not work.
Check whether the Parity and Stop bit of WCS-232 v4.0 match those of your host equipment. WCS-232 v4.0 supports No parity, Even parity and Odd parity, 1 and 2 Stop bit configurations.
Check whether the host equipment of WCS-232 v4.0 uses Hardware Flow Control. WCS-232 v4.0 is initially set to Use of Hardware Flow Control. If your host equipment does not use Hardware Flow Control, please disable the Hardware flow control option by referring to '5.Operating environment setting'. WCS-232 v4.0 does not support RS-232 break signal.

C-1-2. Pin Assignment
WCS-232 v4.0 is a DCE device. If your host equipment is DTE, plug WCS-232 v4.0 directly to the host equipment or use straight RS-232 cable. If your host equipment is DCE, use will need to use a cross over RS-232 cable (Null modem cable) or a Male to Male DB9 Null Modem adapter.

C-2. Data Loss or Malfunctioning

C-2-1. Hardware Flow Control
When transmitting large amounts of data with No Hardware Flow Control, WCS-232 v4.0 may clear the data buffer unexpectedly. The possibility becomes greater as the RF transmission environment becomes worse.

C-2-2. Response Message
AT response messages from the WCS-232 v4.0 may affect the host system unexpectedly. Do not use WCS-232 v4.0 If your applications cannot allow for this wireless time delay.

C-3. Transmission Delay

C-3-1. RF Processing Delay
It takes 30msec approximately for a WCS-232 v4.0 to complete a data transmission to the other Bluetooth device. This time delay cannot be reduced and may enlarge as the RF transmission environment becomes worse. Do not use WCS-232 v4.0 If your applications cannot allow for this time delay.

C-3-2. RF Transmission Environment
If there are many Bluetooth devices working in a small area and/or the RF communication distance is too great and/or there are some obstacles affecting RF performance, the WCS-232 v4.0 repeats the transmission packet by packet due to interferences and/or low RF performance. This may lead to increased data transmission time delays.